UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/613,963	07/03/2003	Sartaj Kumar Sahni	UF-318X	6767

23557 7590 05/13/2008

SALIWANCHIK LLOYD & SALIWANCHIK
A PROFESSIONAL ASSOCIATION
PO BOX 142950
GAINESVILLE, FL 32614-2950

EXAMINER	
CHAN, SAI MING	
ART UNIT	**PAPER NUMBER**
2616	

MAIL DATE	DELIVERY MODE
05/13/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/613,963	SAHNI ET AL.	
	Examiner	Art Unit	
	Sai-Ming Chan	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 February 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yazdani et al. (U.S. Patent #6859455), in view of Rajasekaran et al. (U.S. Patent Publication #20020124003).

Consider **claims 1 and 21,** Yazdani et al. clearly disclose and show a method for improving in dynamic routing tables (column 5, lines 56-58) processes for matching a highest-priority range (fig. 30 (priority); column 30, lines 46-50) with a destination address comprising:

(a) applying a top level binary search tree (fig.4; column 12, lines 37-38) with at least one lower level range search tree (RST) (fig.11b; 100 (range 01-04)) to a nonintersecting highest priority rule table (fig.30) comprising at least one nonintersecting range (fig.11b; column 12, lines 54-57) and corresponding priority (fig.30 (priority)), wherein the PTST comprises at most 2n nodes (fig.4 (P70 is the root node. It branches out with numerous nodes.), with each of the PTST nodes associated with a point value (fig.4 (P70 has the value of (01*, 7));

(b) applying a range allocation rule (column 6, lines 51-62) to allocate to each PTST node a subset of the nonintersecting ranges and corresponding priorities; and

(c) applying an RST to organize the subset (column 6, lines 63-67 , column 7, lines 1-4) of nonintersecting ranges and corresponding priorities allocated to each PTST node.

However, Yazdani et al. do not specially disclose balanced binary search tree, rules for search, insert and delete, empty nodes and range search list.

In the same field of endeavor, Rajasekaran et al. clearly show balanced binary search tree (paragraph 0089 (balanced tree)) and the matching of an address in O(log.sup.2 n) time (paragraph 0009 (log log n)) and inserting or deleting rules in O(log n) time (paragraph 0008 (log n)), n empty nodes (paragraph 0046 (null value)) and range search tree (paragraph 0059).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to show a method of improved matching in a dynamic router table, as taught by Yazdani, and show balanced binary search tree and the rules for search, insert and delete, as taught by Rajasekaran so that the binary trie operation can be carried out efficiently.

Consider **claims 7 and 22,** Yazdani et al. clearly disclose and show a method for improving in dynamic routing tables processes of matching a highest-priority prefix with a destination address and inserting or deleting new rules in O(W) time comprising:

(a) applying a top level binary search tree (PTST) (fig.4; column 12, lines 37-38) with at least one array linear list (ALL) (fig. 5 (each node has a prefix and priority); column 12, lines 40-42) to a highest priority prefix table (fig.30) comprising at least one pair (fig.11b (100) (range 01-04)), wherein the pair comprises a prefix and corresponding priority (fig. 30 (234)), wherein the PTST comprises at most 2n nodes (fig.4 (P70 is the root node. It branches out

with numerous nodes.), with each of the PTST nodes associated with a point value (fig.4 (P70 has the value of (01*, 7));

(b) applying a range allocation rule (column 6, lines 51-62) to each PTST node to allocate to each PTST node a subset of the pairs; and

(c) applying an ALL to organize the pairs (column 6, lines 63-67, column 7, lines 1-4) allocated to each PTST node, wherein the ALL comprises a pair of prefix and corresponding priority.

However, Yazdani et al. do not specially disclose balanced binary search tree, rules for search, insert and delete, empty nodes and array linear list.

In the same field of endeavor, Rajasekaran et al. clearly show balanced binary search tree (paragraph 0089 (balanced tree)) and the matching, inserting or deleting rule in O(W) time (paragraph 0085 (O(R))), n empty nodes (paragraph 0046 (null value)) and array linear list (paragraph 0057).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to show a method of improved matching in a dynamic router table, as taught by Yazdani, and show balanced binary search tree and the rules for search, insert and delete, as taught by Rajasekaran so that the binary trie operation can be carried out efficiently.

Consider **claims 13 ann 23,** Yazdani et al. clearly disclose and show a method for improving in dynamic routing tables (column 5, lines 56-58) processes for longest-prefix, comprising:

(a) applying a top level binary search tree (PTST) (fig.4; column

12, lines 37-38) with at least one W-bit ector (bit(z)) (fig. 4, between P70 (01*, 7) and ((01001100*, 4) and (10110011*, 8))) to a longest-matching prefix-table (fig.30) comprising at least one prefix, wherein the PTST comprises at most 2n nodes, with each of the PTST nodes associated with a point value;

(b) applying a range allocation rule (column 6, lines 51-62) to allocate to each PTST node a subset of prefixes; and

(c) applying the bit(z) to organize the prefixes (column 6, lines 63-67 , column 7, lines 1-4) allocated to each PTST node, wherein an ith position of bit(z) is set to 1 if the prefix with length i is allocated to a PTST node.

However, Yazdani et al. do not specially disclose balanced binary search tree, rules for search, insert and delete, empty nodes and W-bit vectors.

In the same field of endeavor, Rajasekaran et al. clearly show balanced binary search tree (paragraph 0089 (balanced tree)) and the matching of an address in O(W) time (paragraph 0085 (O(R))) and inserting or deleting rules in O(log n) time (paragraph 0008 (log n)), n empty nodes (paragraph 0046 (null value)) and W-bit vectors (paragraph 0125 (vector)).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to show a method of improved matching in a dynamic router table, as taught by Yazdani, and show balanced binary search tree and the rules for search, insert and delete, as taught by Rajasekaran so that the binary trie operation can be carried out efficiently.

Consider **claim 2**, and **as applied to claim 1 above**,

claim 8, and **as applied to claim 7 above**,

claim 14, and **as applied to claim 13 above**,

claim 20, and **as applied to claim 19 above**,

claim 22, and **as applied to claim 21 above**,

claim 24, and **as applied to claim 23 above**,

Yazdani et al., as modified by Rajasekaran et al., clearly show and disclose the method as described.

However, Yazdani et al. do not specially disclose a red-black tree.

In the same field of endeavor, Rajasekaran et al. clearly show a red-blacktree (paragraph 0089 (red-black tree)).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to show a method of improved matching in a dynamic router table, as taught by Yazdani, and show balanced binary search tree, as taught by Rajasekaran so that the binary trie operation can be carried out efficiently.

Consider **claim 3**, and **as applied to claim 1 above**,

claim 9, and **as applied to claim 7 above**,

claim 15, and **as applied to claim 13 above**,

Yazdani et al. as modified by Rajasekaran et al., clearly show and disclose the method, for matching a highest-priority range with a destination address, further comprising the steps of:

(a) conducting a binary search of the PTST based on the destination address, wherein the binary search is conducted along a search path from a root

of the PTST to a leaf of the PTST(column 34, lines 39-60); and

(b) examining the RST(s) of a PTST node (column 34, lines 61-67;column 35, lines 1-33) along the search path for a best matching range and corresponding priority.

Consider **claim 4**, and **as applied to claim 1 above**,

claim 10, and **as applied to claim 7 above**,

claim 16, and **as applied to claim 13 above**,

Yazdani et al. as modified by Rajasekaran et al.,clearly show and disclose the method, for inserting a new rule, further comprising the steps of:

(a) setting an initial node to a root node (fig. 16 (130=root node);) of the PTST in preparation of inserting a new range r;

(b) conducting a binary search (column 17, lines 60-64) on the PTST for a node z such that the range r contains the point value of z (column 18, lines 54-59);

(c) if said node z exits (column 22, lines 26-34 (line 32, else case)), inserting range r into the RST(z) (column 18, lines 54-59); and

(d) if said node z does not exist (column 22, lines 26-34 (line 28, full case)), creating a new PTST node (column 22, lines 26-34 (line 29), inserting the new PTST node into the PTST, and inserting range r into the RST of the new PTST node (column 22, lines 26-34).

Consider **claim 5**, and **as applied to claim 4 above**,

claim 11, and **as applied to claim 10 above**,

claim 17, and **as applied to claim 16 above**,

Yazdani et al. as modified by Rajasekaran et al.,clearly show and disclose the method as described.

However, Yazdani et al. do not specially disclose a rebalanced PTST.

In the same field of endeavor, Rajasekaran et al. clearly show when the new PTST node is inserted into the PTST, the PTST is rebalanced (paragraph 0089 (balanced tree)).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to show a method of improved matching in a dynamic router table, as taught by Yazdani, and show rebalanced PTST, as taught by Rajasekaran so that the binary trie operation can be carried out efficiently.

Consider **claim 6**, and **as applied to claim 1 above**,

claim 12, and **as applied to claim 7 above**,

claim 18, and **as applied to claim 13 above**,

Yazdani et al. as modified by Rajasekaran et al.,clearly show and disclose the described method. However Yazdani et al., as modified by Rajasekaran et al. fails to disclose the deleting of a rule.

In the same field of endeavor, Rajasekaran et al. clearly show the method for deleting a rule, which comprises the steps of:

(a) conducting a binary search of the PTST for a node z such that the range r contains point(z) (column 17, lines 60-64);

(b) if node z exists, deleting range r from the RST of the node z (column

18, lines 15-26);

(c) if the RST of node z becomes empty as a result of deleting range r and node z is a degree 0/1 node (fig. 7 (P7)); deleting node z from the PTST and rebalancing the PTST (column 18, lines 25-34); and

(d) when a size constraint has been violated, deleting a degree 0/1 PTST node having an empty RST and rebalancing the PTST(column 18, lines 31-34).

Response to Amendment

Applicant's arguments filed on February 29, 2008, with respect to claims 1-24, on pages 11-17 of the remarks, have been carefully considered.

In the present application, Applicants basically argue that Yazdani does not teach or suggest "binary search tree and array linear, ALL, or W-bit vector". The Examiner has modified the response with a new reference which combines with Yazdani to provide "binary search tree and array linear, ALL, or W-bit vector". See the above rejections of claims 1-24, for the relevant interpretation and citations found in Rajasekaran, disclosing the missing limitations.

Conclusion

Any response to this Office Action should be **faxed to** (571) 273-8300 **or mailed to**:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Hand-delivered responses should be brought to

Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Sai-Ming Chan whose telephone number is (571) 270-1769. The Examiner can normally be reached on Monday-Thursday from 6:30am to 5:00pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Seema Rao can be reached on (571) 272-3174. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 571-272-4100.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist/customer service whose telephone number is (571) 272-2600.

Sai-Ming Chan

S.C./ sc

May 5, 2008

/Seema S. Rao/

Supervisory Patent Examiner, Art Unit 2616